

We claim:

1. A filter assembly comprising:
  - (a) a housing having an inlet and an outlet, the inlet being configured to receive dirty air into the filter assembly, and the outlet being configured to deliver clean air from the filter assembly;
  - (b) a filter element within said housing, the filter element comprising a particulate filter portion constructed and arranged to remove particulate contaminants from the dirty air; and
  - (c) a sound suppression element within said housing, said suppression element constructed and arranged to provide broadband sound attenuation of at least 6 dB at one meter for the sound passing through the filter assembly.
2. The filter assembly according to claim 1, wherein the particulate filter portion is positioned radially adjacent to the sound suppression element.
3. The filter assembly according to claim 1, the filter element further comprising a chemical filter portion arranged to remove chemical contaminants from the dirty air.
4. The filter assembly according to claim 3, wherein said chemical filter portion comprises an adsorbent material.
5. The filter assembly according to claim 1, wherein said particulate filter portion is configured to provide straight-through flow.
6. The filter assembly according to claim 1, wherein said filter element is cylindrical.
7. The filter assembly according to claim 1, wherein the filter element is obround.

8. The filter assembly according to claim 1, wherein said sound suppression element comprises a resonator.
9. The filter assembly according to claim 1, wherein said sound suppression element is at least partially defined by said housing.
10. The filter assembly according to claim 1, wherein said sound suppression element is constructed and arranged to attenuate the sound passing through the filter assembly by at least 10 dB.
11. The filter assembly according to claim 1, wherein said sound suppression element attenuates sound by at least 6 dB within a frequency range up to about 1100 Hertz.
12. A filter element comprising
  - (a) a sound suppression element constructed and arranged to provide broadband sound attenuation of at least 6 dB at one meter;
  - (b) a particulate filter portion constructed and arranged to remove particulate contaminants from dirty air, the particulate filter portion positioned radially adjacent the sound suppression element; and
  - (c) a chemical filter portion constructed and arranged to remove chemical contaminants from the dirty air.
13. The filter element according to claim 12, wherein said particulate filter portion is configured to provide straight-through flow.

14. A system for producing power, the system comprising
- (a) a fuel cell assembly having an oxidant intake port and a fuel intake port, and configured to produce electrical power from an oxidant and a fuel entering the oxidant port and the fuel intake port, respectively;
  - (b) a filter assembly comprising:
    - (i) a housing having an inlet configured to receive a dirty atmospheric air flowstream, and an outlet connected in fluid communication with the oxidant intake port;
    - (ii) a filter element within the housing arranged and configured to intercept the air flowstream and to deliver clean air to the outlet, the filter element comprising a particulate filter portion constructed and arranged to remove particulate contaminants from the air flowstream; and
  - (c) a sound suppression element within said housing, said sound suppression element construction and arranged to provide broadband sound attenuation of the sound passing therethrough by at least 6 dB at one meter.
15. The system according to claim 14, wherein said sound suppression element attenuates sound by at least 6 dB within a frequency range up to about 1100 Hertz.
16. The system according to claim 14, wherein said sound suppression element is constructed and arranged to attenuate the sound by at least 10 dB.
17. The system according to claim 14, said filter assembly further comprising a chemical filter portion arranged to remove chemical contaminants from the airflow stream.
18. The system according to claim 17, wherein the chemical filter portion comprises an adsorbent material.

19. The system according to claim 18, wherein the adsorbent material is selected from the group consisting of activated carbon, impregnated carbon, activated carbon fibers, ion-exchange resin, ion-exchange fibers, alumina, activated alumina, molecular sieves, and silica.
20. The system according to claim 19, wherein the adsorbent material has a basic surface and is constructed and arranged to remove an acidic contaminant, the acidic contaminant being at least one of sulfur oxides, nitrogen oxides, hydrogen sulfide, hydrogen chloride, and volatile organic acids and nonvolatile organic acids.
21. The system according to claim 19, wherein the adsorbent material has an acidic surface and is constructed and arranged to remove a basic contaminant, the basic contaminant being at least one of ammonia, amines, amides, sodium hydroxides, lithium hydroxides, potassium hydroxides, volatile organic bases and nonvolatile organic bases.
22. The system according to claim 14, wherein said particulate filter portion is configured to provide straight-through flow.
23. The system according to claim 14, further comprising an air compressor.
24. The system according to claim 23, wherein the air compressor is a twin screw compressor.
25. A compressor discharge filter assembly comprising:
- (a) a housing having an inlet and an outlet, the inlet configured for receiving air from a compressor;
  - (b) a particulate filter portion within the housing and in fluid communication with the inlet, the particulate filter portion constructed and arranged to remove particulate contaminants from the air from the compressor; and

- (c) a sound suppression element within the housing, the sound suppression element constructed and arranged to provide broadband sound attenuation of at least 6 dB at one meter.

26. The compressor discharge filter assembly according to claim 25, wherein the particulate filter portion comprises a polytetrafluoroethylene membrane.